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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,657	02/12/2002	Wei-Zhong Li	13854-006001	9368
26181	7590	05/20/2004	EXAMINER	
FISH & RICHARDSON P.C. 3300 DAIN RAUSCHER PLAZA MINNEAPOLIS, MN 55402			CURTIS, CRAIG	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/075,657

Applicant(s)

LI, WEI-ZHONG

Examiner

Craig Curtis

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-27 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Disposition of the Instant Application***

- This Office Action is responsive to Applicant's Amendment filed on 29 January 2004.
- By this amendment, Applicant has amended claims 1, 3-9, 11-14, and 16-22.
- Claims 1-27 presently are pending in the instant application.

### ***Claim Rejections - 35 USC § 112***

1. **Claims 22-27 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01.** The omitted structural cooperative relationships are: it is unclear how, precisely, the individual elements—i.e., a first birefringent material; a structured half wavelength plate coupled to the first birefringent material; a second birefringent material coupled to the structured half wavelength plate, etc.--recited in independent claims 22 & 25 are disposed with respect to one another. That is, the phrase "...coupled to..." does not definitely place each separately recited (and, by extension, disposed) element/material with respect remaining elements/materials.

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### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-4, 8-12, 14, 15, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Riza (6,360,037).

With regard to claims 1, 9, and 21, Riza discloses the invention as claimed--a 2x2 optical switch (see Figs. 3a & 3b) comprising:

a first port (1) adapted to receive an optical input and generate an optical output (1 & 1', respectively));

a second port (2) adapted to receive an optical input and generate an optical output (2 & 2', respectively);

a switching component group (24a and/or 24b) including a singular polarization switch (see col. 4, ll. 55-67--cols. 5-8--col. 9, ll. 1-13; it being noted that the newly recited modifier *singular* does not preclude the presence of additional polarization switches, due to the open-ended transitional "comprising" recited in the preamble) ;

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a first component group coupled between the first port and the switch component group (14a & 26a);

a second component group coupled between the second port and the switch component group (14b & 26b);

wherein,

when the polarization switch is disabled, the switch component group being adapted to pass one or more light beams exiting from the first component group with a first chosen polarization and reintroduce to the first component group with the first chosen polarization without changing the polarization of the one or more light beams (see 24a & 24b; 14a & 26a in Fig. 3a), and

to pass one or more light beams exiting from the second component group with a second chosen polarization into one or more light beams reentering the second component group with the second chosen polarization (see 24a & 24b; 14b & 26b in Fig. 3a), and

when the polarization switch is enabled, the switch component group being adapted to pass one or more light beams exiting from the first component group with the first chosen polarization and reintroduce to the second component group the one or more light beams with the second chosen polarization without changing the polarization of the one or more light beams (see 24a & 24b (as identified in Fig. 3a); 14a and 26a in Fig. 3b), and

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to convert one or more light beams exiting from the second component group with the second chosen polarization into one or more light beams reentering the first component group with the first chosen polarization (see Fig. 3b); and

a reflector (viz., TIR prisms 38).

**With regard to claims 2 & 10**, Riza further discloses wherein said first component group of said 2x2 optical switch of claim 1 is adapted to receive the optical input from said first port (see 14a & 26a) and generate two light beams with the first chosen polarization entering the switch component group (14a being an optical circulator), and to receive two light beams with the first chosen polarization from the switch component group and generate an optical output to the first port (see Fig. 3a); and the second component group is adapted to receive the optical input from the second port (see 14b & 26b) and generate two light beams with the second chosen polarization entering the switch component group (14b being an optical circulator), and to receive two light beams with the second chosen polarization from the switch component group and generate an optical output to the second port (see Fig. 3a).

**With regard to claims 3 & 11**, Riza further discloses wherein said polarization switch comprises a mirror (see retroreflecting prisms 38).

**With regard to claims 4 & 12**, Riza still further discloses wherein said polarization switch comprises a liquid crystal cell (elements 34: see col. 5, ll. 4-20) sandwiched between two transparent conducting plates (inherent).

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**With regard to claim 8**, Riza additionally discloses wherein said switch component group comprises a reflector coupled to the first switch component group (viz., TIR prism 38);

a polarization beam splitter (PBS 36) coupled to the second switch component group, the reflector and the polarization switch.

**With regard to claims 14 & 15**, said TNLCs 34 are filters that are tunable (at least to the extent that they are taught as being switchable).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**3. Claims 20, 22, 23, 25, and 26 are rejected under 35 U.S.C. 102(a) as being anticipated by Li et al. (6,178,044).**

Li et al. disclose the invention as claimed--an optical switch/optical component comprising all the recited elements. See Figs. 2A & 2B.

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### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-7, 13, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Riza (6,360,037) and Li et al. (6,178,044).

Riza discloses the claimed invention as set forth above **EXCEPT FOR**, with regard to these claims, an explicit teaching wherein a structured half wavelength plate is coupled to said first birefringent material; a second birefringent material coupled to the structured half wavelength plate; a half wavelength plate coupled to said second birefringent material; and a Faraday rotator coupled to the half wavelength plate.

Li et al., however, disclose an optical component comprising a structured half wavelength plate (112) coupled to a first birefringent material (108); a second birefringent material (116) coupled to said structured half wavelength plate (112); a half wavelength plate coupled to said second birefringent material (116; see Fig. 2B); and a Faraday rotator (118) coupled to said half wavelength plate (see Fig. 2B), wherein said structured half wavelength plate is coupled to said first birefringent material plate through a wedge (114).



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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of Riza such that it comprise a structured half wavelength plate is coupled to said first birefringent material; a second birefringent material coupled to the structured half wavelength plate; a half wavelength plate coupled to said second birefringent material; and a Faraday rotator coupled to the half wavelength plate, as explicitly disclosed by Li et al., for at least the purpose of manipulating polarization states of light propagating through said 2x2 optical switch in a desired fashion.

### ***Allowable Subject Matter***

5. Claims 24 and 27 are objected to as being dependent upon rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Reasons for Allowance***

The following is an examiner's statement of reasons for allowance:

6. Claims 24 and 27 would be allowable over the prior art for at least the reason that the prior art fails to teach or to reasonably suggest *an optical component or optical component group comprising, inter alia, a structured half wavelength plate that includes two regions of half wavelength plates placed diagonal to each other and two regions of transparent plates placed diagonal to each other, as set forth in the claimed combination.*

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### ***Response to Arguments***

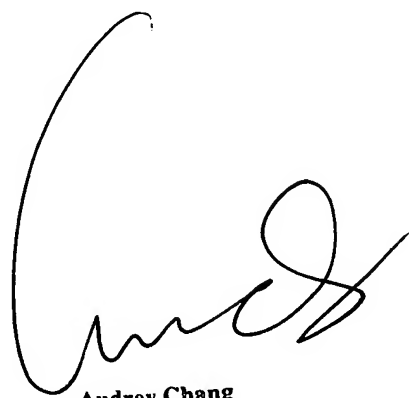
7. Applicant's arguments with respect to claim have been considered but are moot in view of the new ground(s) of rejection presented hereinbefore.

### ***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (571) 272-2311. The facsimile phone number for Art Unit 2872 is (703) 308-7722.

Any inquiry of a general nature regarding the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

C.H.C.  
Craig H. Curtis  
Group Art Unit  
14 May 2004



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